Summary of Cancer Incidence and Mortality for Zip Code 29657 (Liberty, SC)

Cancer Incidence in Zip Code 29657

The first step in the analysis of cancer data for zip code 29657 was to look at the number of new cancer cases diagnosed in the zip code and compare this to the number of cancer cases expected (see Table 1). This first step seeks to determine whether there is anything unusual with cancer patterns in the area. The number of "expected" cancer cases is calculated by using South Carolina cancer rates and applying them to the population of the zip code.

Table 1 shows what types of cancer occurred in zip code 29657 from 1996-2000, and how many cancer cases were expected. Overall, there were fewer cases of cancer than expected. A total of 279 new cases of cancer occurred in the zip code, while 304 cases were expected. The analysis revealed one type of cancer **(leukemia)** where the number of cases was significantly higher than expected. A total of 11 leukemia cases occurred while 7 were expected. Of the 11 leukemia cases, 4 occurred in children ages 0-14 years old, when only 1 case would have been expected.

There are four main types of leukemia, and each has a different set of risk factors associated with it. Chronic lymphocytic (CLL) and chronic myelocytic leukemias (CML) occur most often in adults. The only known inherited risk factor for chronic leukemia is having first degree relatives who have had CLL. Long term contact with herbicides and pesticides among farmers can increase the risk of CLL.

Acute lymphocytic leukemia (ALL) occurs most often in children. Acute myelocytic leukemia (AML) occurs mostly in adults. Smoking is a risk factor for AML. About 1/5 of AML cases are caused by smoking. Also, scientists have discovered that people exposed to benzene or to large amounts of radiation (such as in people receiving treatment for other cancers) have an increased risk of ALL and AML.

Cancer Deaths in Zip Code 29657

To assess cancer deaths in this zip code, cancer mortality data from 1998-2002 were used. The same process used to analyze new cancer cases was also used to evaluate cancer deaths. Table 2 shows the number of cancer deaths that occurred and the number expected in the zip code. A total of 123 cancer deaths occurred in this zip code, while 144 deaths were expected. Therefore, there were fewer cancer deaths than expected.

The analysis did not reveal any types of cancer where the number of cancer deaths was significantly higher than the number of cancer deaths expected.

Conclusions

To summarize, fewer cancer cases and cancer deaths occurred in zip code 29657 than expected. Pediatric leukemia cases were significantly elevated in this zip code; however, upon further examination, we do not see evidence of a cancer cluster. The following explains the reasoning behind this conclusion.

The difference between the observed and expected numbers (i.e. less cases overall than expected) suggests that the 29657 zip code may have a somewhat younger aged population than all of Pickens County as a whole. The lesser occurrence of breast and colorectal cancer in particular supports this; and likewise, the elevated occurrence of pediatric leukemia does as well (i.e. there are more young people residing in this zip code).

Childhood cancer has long been a very serious concern for citizens in the community and for researchers. One of the aspects of childhood cancer noted over years of study is that childhood leukemia has a tendency to cluster, as this zip code 29657 may suggest. The South Carolina Central Cancer Registry (SCCCR) investigates findings of unusual occurrence of cancer to assess whether evidence exists for the presence of environmental carcinogenic exposures. Pickens County has been investigated before, and for concerns over leukemia. Those reports were occupational and the cases were adults. The SCCCR has also investigated other reports of high rates of childhood leukemia, one investigation was in Horry County, another county with a larger proportion of childbearing age residents (i.e. a growing community).

In the present data, the four childhood leukemia cases are consistent with the 'expected' characteristics for childhood leukemia based on state and national statistics. The majority of the cases are males, all are Caucasian, the majority are young (<10 years old) and their cell type is lymphocytic, as contrasted to myelocytic (the form usually linked to environmental hazards). These pieces of evidence, including the evidence for a majority of younger age residents in the zip code community, indicate the pattern of clustering 'random', and is most associated with the younger age distribution of the community. Also, the cases are not clustered in time. There is a steady occurrence of one case per year over the period examined.

Finally, there are several reasons why this pattern does not suggest an environmental hazard. First, the surrounding counties do not show an excess of pediatric leukemia cases. This could represent a pattern for residential settlement favoring the 29657 zip code (i.e. it being a regional growth community). Next, a previous health study in Pickens County focused on contamination from polychlorinated biphenyls [PCBs]. Therefore, the SCCCR consulted literature to see which cancers might occur as a result of exposure to PCBs[1]. Liver cancers and soft tissue sarcomas were distinctly identified as being related to PCB exposure. Neither Pickens County, nor its surrounding counties (Greenville, Oconee, Anderson) have any elevations of these PCB-specific cancers.

Therefore, for these reasons, it is determined that the finding of elevated pediatric cancer is an artifact, that is, while it does represent an excess occurrence, it is one that is reasonable given the distribution of overall cases and the population. There is no evidence of a hazardous exposure to an environmental carcinogen from these data.

Finally, as part of the SCCCR's protocol, a panel of epidemiologists and environmental specialists reviews our procedures and findings here at DHEC. Therefore, their review of these findings will be ascertained in due course as well. Please contact our office if you have any questions or continuing concerns.

Footnotes:

1. Cancer Epidemiology and Prevention, 2nd Edition. Schottenfeld D and Fraumeni JF Jr. Editors. Published by Oxford University Press. New York, NY. 1996.

Report provided by:

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Information on cancer incidence provided by the SC Central Cancer Registry, Office of Public Health Statistics and Information Services, SC Dept. of Health and Environmental Control.

Information on cancer mortality provided by the Division of Vital Records and the Division of Biostatistics, SC Dept. of Health and Environmental Control.

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Table 1. Analysis of New Cancer Cases in Zip Code 29657, 1996-2000

Site	Observed	Expected	Observed/Expected	Chi-SquareTest*
Lung/Bronchus	50	47.07	1.06	0.18
Prostate	48	48.23	1.00	0.00
Female Breast	33	45.33	0.73	3.35
Colon/Rectum	30	35.19	0.85	0.76
Melanoma	12	10.67	1.12	0.16
Bladder	11	11.93	0.92	0.07
Non-Hodgkin Lymphoma	11	10.03	1.10	0.09
Leukemia	**11**	**6.07**	**1.81**	**4.01**
Unknown/Ill-Defined	7	NA	NA	NA
Uterus	6	7.34	0.82	0.24
Kidney/Renal Pelvis	5	7.66	0.65	0.92
Ovary	5	5.05	0.99	0.00
Pancreas	3	6.87	0.44	2.18
Oral/Pharynx	2	8.76	0.23	5.22
All Sites	279	303.88	0.92	2.04

Excludes in situ cases of cancer to allow for comparison.

Cancer sites with less than 5 cases of cancer expected are not analyzed due to the unreliability of statistical tests based on small numbers. These sites have been removed from this table.

*The Chi-Square statistical test allows us to determine if the difference between what is observed and what is expected is significant. If the value is greater than 3.84, then we are 95% confident that the observed number of cases is significantly different from the expected number of cases.

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Table 2. Analysis of Cancer Deaths in Zip Code 29657, 1998-2002

Site	Observed	Expected	Observed/Expected	Chi-SquareTest*
Lung/Bronchus	47	41.15	1.14	0.83
Colon/Rectum	11	14.35	0.77	0.78
Female Breast	11	10.60	1.04	0.02
Prostate	7	10.13	0.69	0.97
Non-Hodgkins Lymphoma	4	5.23	0.77	0.29
Pancreas	3	7.93	0.38	3.06
Leukemia	3	5.15	0.58	0.90
Unknown/Ill-Defined	1	8.81	0.11	6.92
All Sites	123	143.45	0.86	2.92

Cancer sites with less than 5 cancer deaths expected are not analyzed due to the unreliability of statistical tests based on small numbers. These sites have been removed from this table.

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